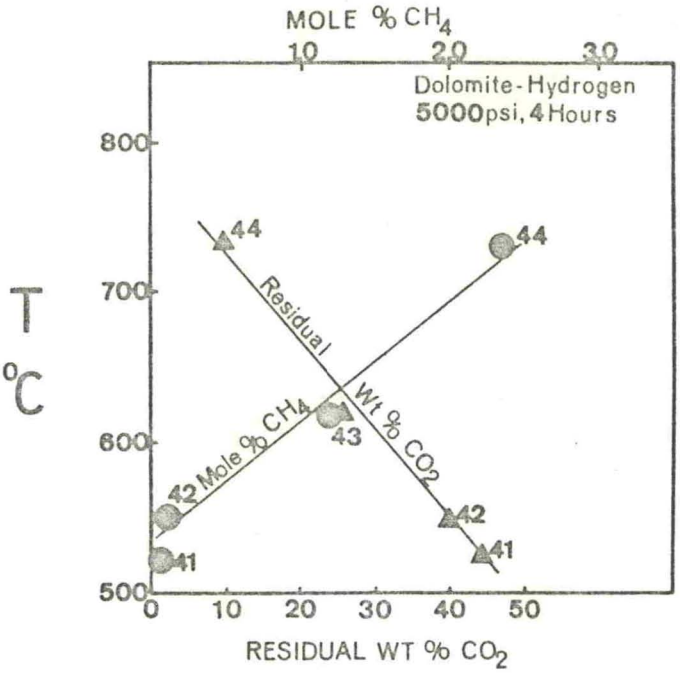

FIG. 9. Plot of mole % CH_4 generated and residual wt % CO_2 in the solid for the dolomite-hydrogen system at 5000 psi (H_2); 4 hour experiments; at temperatures of 525, 550, 620, and 735°C.

$$4H_2 + CaMg(CO_3)_2 = CaCO_3 + Mg(OH)_2 + CH_4 + H_2O.$$

At 5000 psi (H_2) reaction initiates as low as 520°C (Table 4). Calcite formed from dolomite persists at higher temperatures than does calcite alone in the calcite-hydrogen system. Similarities exist between the thermal dissociation of carbonates and the reaction of carbonates with hydrogen. In the dolomite-hydrogen system CH_4 may influence the reaction in a manner similar to CO_2 in the thermal decomposition of calcite. This possibility will be explored in future studies.

$Mg(OH)_2$ or MgO formed in the first stage is non-crystalline to X-rays. Chemical analyses by atomic absorption indicates 17% MgO in the solid reaction products.

A very minor amount of black lustrous material is present in the reaction products. It is similar in all appearances to the graphite formed in the calcite experiments. "Soot-like" material also was present in the bomb, and again was particularly noticeable at higher temperatures.

The reaction gases were those also present in the calcite experiments. (Table 4). Carbon dioxide appears in two experiments (nos. 83, 84) but